

SECRET

Copy No. a of a-4

Log # 225X1

25X1

[Redacted]

January 26, 1971

ACTIVITY SUMMARY

TO: John C.
FROM: [Redacted]
SUBJECT: Facility Visit, Contract
[Redacted]
REFERENCE: [Redacted] 2201201-AS-24
DATE: 13, 14 January 1971

25X1

25X1

25X1

This facility visit was performed by [Redacted]
of [Redacted]

25X1

25X1

The visit was directed to the following objectives:

1. Review the Program Outline delivered as part of the activity summary #23, dated January 11, 1971. This outline was generated to provide direction concomitant with the total program schedule.
2. Review with John C. the status of image selections during the past month. This was intended for assessment of the type of imagery selected and definition of required target types.
3. Specify a detailed program outline for the next four months of this program, for sponsor personnel.
4. Review status of image selections with Dennis R. as a basis for complex filter requirements for inline coherent optical processing.
5. Deliver process and material requirements for fabrication of phase components of complex filters.
6. Performance of OIM in the sponsor lab facility on selected targets.

Declassification
Review by
NGA/DoD

GROUP 1

EXCLUDED FROM AUTOMATIC
DOWNGRADING AND
DECLASSIFICATION

SECRET

NOTICE

THIS MATERIAL CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C. SECS. 793 AND 794, THE TRANSMISSION OR RECEPTION OF WHICH IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

~~SECRET~~

All the above objectives were met during this visit except for #4 because of the absence of Dennis R. Details of OIM are recorded in the notebook.

25X1

As part of the program scheduling a schedule for [] personnel at the sponsor facility was generated, based on a 2 1/2 man-days/week participation at the facility. This schedule is detailed for the next four months and is attached to this activity summary.

25X1 The next program visit is scheduled for 20,21 January by [] and on 21,22 January by [] Emphasis 25X1 will be placed on optical manipulation in the lab and generation of targets for measurement of system response. Attached to this Activity Summary is the Program Plan for the week of 18 January, 1971. A copy was left at the sponsor facility on 14 January.

~~SECRET~~

~~SECRET~~

3

25X1

[REDACTED] SCHEDULE

[REDACTED] AT

25X1

[REDACTED]
OPTICAL IMAGE MANIPULATION

1. Amplitude filter, high frequency enhancement.

Purpose of Procedures: These procedures are being performed to measure system response given present development, and to demonstrate applicability to operational imagery.

- A. Provide specifications and assistance where needed to the generation and selection of targets.

1. Targets for system response measurement.

2. Operational targets.

- B. Perform optical image manipulation of targets generated or selected above utilizing the amplitude filters developed during previous months effort.

- C. Analysis

1. Provide an outline for measurement process and perform and assist where needed for reduction of data utilizing targets generated above in A1.
 2. Perform a visual quality assessment on processed photography especially by way of comparison with the input image.
 3. Correlate, where relevant, the measured frequency response from targets generated in A1 above.

~~SECRET~~

~~SECRET~~

4. Correlate measured data with predicted data based on system model:

D. Noise Suppression Filter

1. Design of experiment to test noise suppression filter without affecting system resolution capability.
2. Analyze capability of the method applied at this state of development.

- E. Utilize information gained during these tests for design specifications during the continuing program in amplitude filtering.

II. Complex Filter, In-line Coherent Optical Processing

Purpose of Procedures: - To establish a preliminary filter bank for use in correcting aberrated imagery by optical processing.

- A. Provide necessary information and assistance to establish techniques for fabricating the phase component of in-line complex filters (image blur and defocus filters).
- B. Evaluate optical requirements for glass substrate of filter.
- C. Design a filter bank utilizing available data for specification of aberration scales.
- D. Provide assistance where necessary in fabrication of filters.
- E. Generate and/or select targets for test, evaluation and application of filters.

~~SECRET~~

25X1

 SCHEDULE
(Manhours*)

Item No.	Jan			Feb				March					April			
	11	18	25	1	8	15	22	1	8	15	22	29	5	12	19	26
I A 1	2	2	1	1												
2	2	1	1													
B	10	12	8	12	12		12	12	12	8	8	8	4	4	4	2
C 1		1	1	1			4									
2							1	2		1						
3							1	2	2	2	1					
4										1	1	2	2	2	1	
D 1										4	2					
2										2	2	4	4			
E														4	4	2
IIA	2	2	8	4	4	16	2									
B			1	1												
C		2			4	4		4	4	2	2	2	1			
D											4	4	8	8	8	8
E								2					1	2	3	8

* This is a 'best estimate' schedule based on subject matter to be covered. The weighting of each is based on a 2-1/2 man day per week schedule at the sponsor facility.

SECRET

Program Plan

To John C.

25X1

From [redacted]

Subject Program Plan for week of Jan. 13, 1971

Date Jan. 14, 1971

25X1

This plan consists of an outline and discussion of the program performed at the [redacted] The effort [redacted] includes sponsor personnel and [redacted]

25X1

[redacted] personnel.

The objective of the next four months as noted in the Activity Summary #23, is to evaluate performance of the high frequency enhancement ^{system} as it is presently configured. The evaluation is relevant to a measure of system frequency response and correlation to predicted characteristics as well as its

SECRET

relevance to improving low contrast information on operational material. Remember that the system is being applied to the low contrast operational material as a pre-filter to viewing. Its frequency response is predicted to be an optimization filter for the low contrast information.

The objective of the next four months also includes initiation and implementation of a filter bank for a specific class of complex filters, especially approximate inverse filters for defocused imagery and imagery with IMC errors.

The objective for the week of 12 Jan 1971 is directed to the goals outlined above. During this week we will emphasize the high frequency system

SECRET

SECRET

by performance of optical image manipulation on selected targets. This will, as always occurs during this stage of optical processing, entail a checkout of the optics such as cleaning, alignment and focusing. The configuration of source geometry and filter (transmittance and diameter) will remain as previously used. Some small amount of time will be budgeted for review of selected imagery for CIM input. Of importance to the goals of this program will be time budgeted to prepare special targets for system measurement. This includes a bar target, a sinusoidal target and an edge target. We will define the exact characteristics needed, initiate target fabrication and tracing and program computer software for

SECRET

~~SECRET~~

25X1 sine-wave and edge target data reduction. personnel will get involved with the computational aspects this week so that the schedule can be defined.

With respect to the phase filter effort, we have a materials (chemical) listing required for the process. This should be reviewed and materials obtained. During the week of 18 Jan. we will also initiate design of filters by determining appropriate scale factors for defocus and IMC errors that are system specific. We will design the filter bank to give flexibility in reconstruction processes, for system imagery as well as other possible inputs.

SECRET

SECRET

25X1

Program Outline

Week of 18 Jan, 1971

25X1

Item	Manpower, man-days	Sponsor Lab.	
1 Optical image manipulation activity in sponsor laboratory.		1 1/2	2
2 Generation of special targets for measurement of system frequency response.		1	1/4
a) Bar target			
b) Sinusoidal target			
c) Edge target			
3 Definition of measurement program, including requirements for edge trace analysis, computer program schedule, data reduction of other targets.			lat ☐ deliverable schedule
4 Selection of appropriate reconnaissance imagery for OIM		1/4	1/4
5 Initiation of phase relief sensitometry by		1	1/25X1
a) design of experiment & procedure; write up for Laboratory use in sensitometry & measure.			lat ☐ deliverable schedule
b) check out of supply			

SECRET

SECRET

25X1

6 Design of complex filters
utilizing available
system specific data
and other expected
scenarios for defocus
and image blur.

Sponsor Lab
1/4

1/2

SECRET